

### AMENDMENTS TO THE CLAIMS

Following is a listing of all claims in the present application, which listing supersedes all previously presented claims:

Listing of the Claims:

Claims 1-8. (Canceled)

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9. (Currently Amended) A sensing apparatus, comprising:

a fluxgate including

a driving coil for exciting a magnetic substance core with a current,

first and second current amplifiers for applying the current to first and second ends of the driving coil,

a pulse generator for generating a pulse to turn on/off the first and second current amplifiers, and

a pulse controller for outputting a control signal allowing the pulse to be applied to the first and second current amplifiers, the pulse controller

outputting the control signal at a start of a sensing cycle, the fluxgate

generating an analog signal due to the excited magnetic substance; and

an A/D converter for converting the analog signal from the fluxgate into a digital signal, wherein the pulse controller stops outputting the control signal before an end of a sensing cycle when the A/D converter outputs the digital signal to the pulse controller.

10. (Currently Amended) ~~[[The]] A sensing apparatus as claimed in claim 9,~~  
~~further comprising:~~

a fluxgate including

a driving coil for exciting a magnetic substance core with a current,  
first and second current amplifiers for applying the current to first and  
second ends of the driving coil,  
a pulse generator for generating a pulse to turn on/off the first and  
second current amplifiers,  
a pulse controller for outputting a control signal allowing the pulse to  
be applied to the first and second current amplifiers, the pulse controller  
outputting the control signal at a start of a sensing cycle, the fluxgate  
generating an analog signal due to the excited magnetic substance;  
an A/D converter for converting the analog signal from the fluxgate into a digital  
signal, wherein the pulse controller stops outputting the control signal when the A/D  
converter outputs the digital signal to the pulse controller; and  
an AND gate for logical AND-ing the pulse from the pulse generator with the control  
signal from the pulse controller ~~to send~~ for outputting an output signal to the first and second  
current amplifiers in accordance with the logical AND-ing.

11. (Previously Presented) The sensing apparatus as claimed in claim 10, wherein  
the pulse controller outputs a high level signal during conversion of the analog signal from  
the fluxgate, and the pulse controller outputs a low level signal when the conversion of the  
analog signal into the digital signal by the A/D converter is complete and the A/D converter  
outputs the digital signal to the pulse controller.

12. (Previously Presented) The sensing apparatus as claimed in claim 11, wherein  
the pulse controller outputs the low level signal a predetermined time period after the

conversion of the analog signal into the digital signal is complete and the A/D converter outputs the digital signal to the pulse controller.

13. (Currently Amended) A sensing apparatus having a fluxgate, comprising:  
a pulse controller for generating a pulse to block current from flowing into a driving coil of the fluxgate before an end of a sensing cycle when it is determined that conversion of an analog signal from the fluxgate to a digital signal is completed by an A/D converter and the A/D converter outputs the digital signal to the pulse controller.

14. (Currently Amended) A control method of a sensing apparatus having a driving coil for exciting a magnetic substance core with a current; first and second current amplifiers for applying current to first and second ends of the driving coil, respectively; a fluxgate with a pulse generator for generating a pulse to turn on/off the first and second current amplifiers; an A/D converter for converting an analog signal from the fluxgate into a digital signal; and a pulse controller for outputting a control signal for controlling the pulse generator, the control method comprising:

a) driving the pulse generator when the fluxgate initiates a drive and outputting a first control signal in order for the pulse generated from the pulse generator to be applied to the first and second current amplifiers; and

b) outputting a second control signal in order for the pulse generated from the pulse generator not to be applied to the first and second current amplifiers when the conversion of the analog signal into the digital signal by the A/D converter is complete before an end of a sensing cycle and the A/D converter outputs the digital signal to the pulse controller.

15. (Currently Amended) ~~[[The]]~~ A control method as claimed in claim 14, further comprising of a sensing apparatus having a driving coil for exciting a magnetic substance core with a current; first and second current amplifiers for applying current to first and second ends of the driving coil, respectively; a fluxgate with a pulse generator for generating a pulse to turn on/off the first and second current amplifiers; an A/D converter for converting an analog signal from the fluxgate into a digital signal; and a pulse controller for outputting a control signal for controlling the pulse generator, the control method comprising:

a) driving the pulse generator when the fluxgate initiates a drive and outputting a first control signal in order for the pulse generated from the pulse generator to be applied to the first and second current amplifiers;

b) outputting a second control signal in order for the pulse generated from the pulse generator not to be applied to the first and second current amplifiers when the conversion of the analog signal into the digital signal by the A/D converter is complete and the A/D converter outputs the digital signal to the pulse controller; and

logical AND-ing in an AND gate in the sensing apparatus the pulse from the pulse generator with the control signal from the pulse controller to send and outputting an output signal to the first and second current amplifiers in accordance with the logical AND-ing.

16. (Currently Amended) The control method as claimed in claim 15, wherein in a) the pulse controller outputs a high level signal as the first control signal ~~to the AND gate,~~ and in b) the pulse controller outputs a low level signal as the second control signal ~~to the AND gate.~~